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# **Nanoindentation of thin glass fibers**

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## **Abstract**

Nanoindentation has been used to determine hardness and elastic modulus of glass fibers with diameters in the range of 5-20 $\mu$ m. The samples include both continuous E-glass fibers and stone wool fibers as well as a bulk basaltic glass sample. By experimenting on mounting techniques and indentation procedures it has been possible to get consistent data on the fiber samples. This provides a direct tool to characterize the intrinsic mechanical properties of thin fibers. Fibers, independent of the composition, show a tendency of increasing hardness ( $H$ ) and elastic modulus ( $E$ ) with increasing fiber diameter. This shows that the cooling rate effect on glass structure can be characterized by nanoindentation measurements. Indenting the cast surface of the bulk basaltic glass, shows a surface layer with a depth of 100 nm that has higher  $H$  and  $E$  than the interior glass. Further experiments are planned to be carried out in order to gain more information and better understanding on the observed phenomena.